In the Claims

The following is a complete listing of the claims and replace all prior claims in the application:

1. (Withdrawn) A method for forming self-pinned abutted junction heads, comprising:

forming a free layer having a first end and a second end defining a width selected to form a desired trackwidth; and

forming an extended self-pinned bias layer extending beyond the ends of the free layer, the self-pinned bias layer extending beyond the free layer increasing the volume of the extended self-pinned bias layer to provide greater thermal stability and stronger pinning of the free layer.

2. (Withdrawn) The method of claim 1 further comprising forming a self-pinned layer on a side of the free layer opposite the self-pinned bias layer, the self-pinned layer extending beyond the ends of the free layer wherein the free layer is disposed at a central region of the self-pinned layer.

3. (Withdrawn) The method of claim 2, wherein the forming the self-pinned bias layer and the self-pinned layer further comprises forming a self-pinned bias layer and a self-pinned layer having increased stress anisotropy.

4. (Withdrawn) The method of claim 1 further comprising forming a spacer layer between the free layer and the self-pinned bias layer.

5. (Withdrawn) The method of claim 1 further comprising forming a first shield layer interleaving the self-pinned layer between the first shield layer and the free layer and forming a second shield layer interleaving the self-pinned bias layer between the second shield layer and the free layer.

6. (Withdrawn) The method of claim 5 further comprising forming a first seed layer between the first shield layer and the self-pinned layer and forming a second seed layer between the self-pinned bias layer and the second shield layer.

7. (Withdrawn) The method of claim 1, wherein the forming the extended self-pinned bias layer further comprises forming the extended self-pinned bias layer with a large negative magnetostriction.

8. (Withdrawn) The method of claim 7 further comprising forming a self-pinned layer on a side of the free layer opposite the self-pinned bias layer, the self-pinned layer having a large positive magnetostriction.

9. (Currently Amended) A self-pinned abutted junction magnetic read sensor, comprising:

a free layer having a first end and a second end defining a width selected to form a desired trackwidth; and

~~an extended~~ a self-pinned ferromagnetic bias layer extending beyond the ends of the free layer, the self-pinned ferromagnetic bias layer extending beyond the free layer to ~~increasing~~ increase the volume of the extended self-pinned bias layer thereby improving ~~to provide greater~~ thermal stability and ~~stronger~~ pinning of the free layer.

10. (Currently Amended) The sensor of claim 9 further comprising a self-pinned layer formed on a side of the free layer opposite from the self-pinned bias layer, the self-pinned layer extending beyond the ends of the free layer wherein the free layer is disposed at a central region of the self-pinned layer and wherein the self-pinned bias layer and the self-pinned layer have increased stress anisotropy.

11. (Currently Amended) The sensor of claim 9 ~~10, wherein the self-pinned bias layer and the self-pinned layer have increased stress anisotropy~~ further comprising a first and second hard bias layer abutting at least a portion of the first and second ends of the free layer in a longitudinal direction.

12. (Currently Amended) The sensor of claim 9 further comprising a spacer layer formed between the free layer and the self-pinned ferromagnetic bias layer.

13. (Currently Amended) The sensor of claim 9 further comprising a first shield layer interleaving the self-pinned layer between the first shield layer and the free layer and a second shield layer interleaving the self-pinned ferromagnetic bias layer between the second shield layer and the free layer.

14. (Currently Amended) The sensor of claim 13 further comprising a first seed layer formed between the first shield layer and the self-pinned layer and a second seed layer formed between the self-pinned ferromagnetic bias layer and the second shield layer.

15. (Currently Amended) The sensor of claim 9, wherein the ~~extended~~ self-pinned ferromagnetic bias layer further comprises a large negative magnetostriction.

16. (Currently Amended) The sensor of claim 15 further comprising a self-pinned layer formed on a side of the free layer opposite the self-pinned ferromagnetic bias layer, the self-pinned layer having a large positive magnetostriction.

17. (Currently Amended) A magnetic storage system, comprising:

a moveable magnetic storage medium for storing data thereon;

an actuator positionable relative to the moveable magnetic storage medium; and

a magnetoresistive sensor, coupled to the actuator, for reading data from the magnetic recording medium when position to a desired location by the actuator, wherein the magnetoresistive sensor further comprises:

a free layer having a first end and a second end defining a width selected to form a desired trackwidth; and

~~an extended~~ a self-pinned ferromagnetic bias layer extending beyond the ends of the free layer, the self-pinned ferromagnetic bias layer extending beyond the free layer to ~~increasing~~ increase the volume of the extended self-pinned bias layer thereby improving ~~to provide greater~~ thermal stability and ~~stronger~~ pinning of the free layer.

18. (Currently Amended) The magnetic storage system of claim 17 further comprising a self-pinned layer formed on a side of the free layer opposite from the self-pinned bias layer, the self-pinned layer extending beyond the ends of the free layer wherein the free layer is disposed at a central region of the self-pinned layer and wherein the self-pinned bias layer and the self-pinned layer have increased stress anisotropy.

19. (Currently Amended) The magnetic storage system of claim 17 ~~18,~~ ~~wherein the self-pinned bias layer and the self-pinned layer have increased stress anisotropy~~ further comprising a first and second hard bias layer abutting at least a portion of the first and second ends of the free layer in a longitudinal direction.

20. (Currently Amended) The magnetic storage system of claim 17 further comprising a spacer layer formed between the free layer and the self-pinned ferromagnetic bias layer.

21. (Currently Amended) The magnetic storage system of claim 17 further comprising a first shield layer interleaving the self-pinned layer between the first shield layer and the free layer and a second shield layer interleaving the self-pinned ferromagnetic bias layer between the second shield layer and the free layer.

22. (Currently Amended) The magnetic storage system of claim 21 further comprising a first seed layer formed between the first shield layer and the self-pinned layer and a second seed layer formed between the self-pinned ferromagnetic bias layer and the second shield layer.

23. (Currently Amended) The magnetic storage system of claim 17, wherein the ~~extended~~ self-pinned ferromagnetic bias layer further comprises a large negative magnetostriction.

24. (Currently Amended) The magnetic storage system of claim 23 further comprising a self-pinned layer formed on a side of the free layer opposite the self-ferromagnetic pinned bias layer, the self-pinned layer having a large positive magnetostriction.

25. (Currently Amended) A self-pinned abutted junction magnetic read sensor, comprising:

means for sensing having a first end and a second end defining a width selected to form a desired trackwidth; and

ferromagnetic means for biasing the means for sensing, the means for biasing the means for sensing extending beyond the ends of the means for sensing, the extension of the means for biasing the means for sensing ~~increasing~~ to increase the volume of the means for biasing to improve ~~provide greater~~ thermal stability and ~~stronger~~ pinning of the free layer.

26. (Withdrawn) A magnetic storage system, comprising:

a moveable magnetic storage means for storing data thereon;

an actuator positionable relative to the moveable magnetic storage medium; and

a magnetoresistive sensor, coupled to the actuator, for reading data from the magnetic recording medium when position to a desired location by the actuator, wherein the magnetoresistive sensor further comprises:

means for sensing having a first end and a second end defining a width selected to form a desired trackwidth; and

means for biasing the means for sensing, the means for biasing the means for sensing extending beyond the ends of the means for sensing, the extension of the means for biasing the means for sensing increasing the volume of the means for biasing to provide greater thermal stability and stronger pinning of the free layer.